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A REVIEW OF THE SUBSPECIES OF *AGRAULIS VANILLAE*
(LINNAEUS). LEPIDOPTERA: NYMPHALIDAE

By CHARLES D. MICHENER¹

Agraulis vanillae is a widely distributed and highly variable species. Its most distinctive structural characteristics have been enumerated in a paper on the genera of Heliconiinae (Michener, 1942, Amer. Mus. Novitates, No. 1197); certain other features are listed as follows:

Length of forewing 23 to 40 mm. Ground color of upper surface of both wings and under surface of basal two-thirds of forewing orange; upper surface with black streaks along distal parts of veins of forewing, and black border lobate within on outer margin of rear wings, this border usually provided with a row of orange spots; upper and under surfaces of forewing with dark area along costal margin, with two black spots in discal cell and with black area at apex of cell which is sometimes united with spots in cells M_3 , Cu_1 and Cu_2 and with the dark area of the costal margin. Under surface of posterior wing and of apex of forewing brown, streaked with yellowish and silver in varying proportions.

This species appears to be primarily divided into two sections: one, here subdivided into two subspecies, including the forms of continental North America, and the other, with its several subspecies, including the South American and Antillean forms. The distinctions between the two sections are emphasized in the first couplet of the accompanying key.

KEY TO THE SUBSPECIES OF *Agraulis vanillae*²

1.—Forewing with three silver spots on upper surface; black areas of end of discal cell

¹ Thanks are due to Mr. Wm. P. Comstock for aid in the preparation of this paper, to Mr. C. F. dos Passos for the loan of a series of *Agraulis vanillae* from his collection and to Dr. Wm. T. M. Forbes for notes on specimens of the subspecies *lucina* and *catella* in the Cornell University collection and for the loan of a series of the new subspecies *forbesi*.

² It must be stated that this, like most keys to subspecies, cannot be used to identify satisfactorily every specimen; a series of specimens from any region should be examined before they are definitely placed as to subspecies.

separated from black spot in cell M_3 , a line drawn through centers of black areas of end of cell passing well behind black spot in M_3 (North and Central America) 2.

Forewing with not more than two silver spots on upper surface; black areas of end of discal cell frequently meeting spot in M_3 or usually directed in such a way that a line through their centers would pass through black spot in M_3 (South America and Antilles) 3.

2.—Black areas along distal portions of veins in middle of apical part of forewing usually separated by more than their widths; black spots in cells M_3 , Cu_1 and Cu_2 usually smaller in diameter than the narrow black rings surrounding silver spots of upper surface of forewing. *incarnata*.

Black areas along distal portions of veins in middle part of forewing usually separated by their widths or less; black spots in cells M_3 , Cu_1 and Cu_2 usually at least as large in diameter as the broad black rings surrounding silver spots of upper surface of forewing. *nigrior*.

3.—Posterior wing with marginal black band not or scarcely spotted with orange. *lucina*.

Posterior wing with marginal black band provided with a row of small or large orange spots. 4.

4.—Posterior wing with orange spots of marginal band small, less than half as long as width of band. *catella*.

Posterior wing with orange spots of marginal band large, more than half as long as width of band. 5.

5.—Forewing with costal margin evenly convex throughout; forewing short, least breadth measured from tornus considerably more than half the length; black spots at end of discal cell fused with spot in cell M_3

..... *galapagensis*.

Forewing with costal margin nearly straight medially; forewing longer, least breadth measured from tornus but little more than half the length, or if considerably more, black spot in cell M_3 free from other black areas. 6.

6.—Forewing with posterior black spot of end of discal cell rounded or transverse, separated from black spot of cell M_3 by more than its length; posterior wing usually with three black spots in addition to marginal band. 7.

- Forewing with posterior black spot of end of discal cell rather large, usually elongate, frequently reaching spot in M_3 or separated from it by less than its length; posterior wing usually with one or two black spots. 8.
- 7.—Under surface of posterior wing with a pair of separate silver spots at the apex of each of the cells between veins M_1 and $2A$ *maculosa*.
- Under surface of posterior wing with marginal silver spots of each cell united at wing margin. *forbesi*.
- 8.—Black areas at apices of forewing veins narrowed toward outer margin of wing in males; black spots in cells Cu_1 and Cu_2 of forewing small or absent. *vanillae*.
- Black areas at apices of forewing veins larger, at least that of Cu_2 not narrowed toward outer margin; black spots in cells Cu_1 and Cu_2 of forewing large. *insularis*.

***Agraulis vanillae vanillae* (Linnaeus)**

Papilio (Nymphalis) vanillae LINNAEUS, 1758, Syst. Nat., 10th ed., p. 482.

Papilio passiflorae FABRICIUS, 1793, Ent. Syst., III, p. 60.

Dione vanillae, HÜBNER, [1819], Verz. bekannte Schmett., p. 31.

Argynnis vanillae, LATREILLE, in Latreille and Godart, 1820, Ency. Méth., IX, p. 262.

Argyrea vanillae, BILLBERG, 1820, Enumer. Ins. in Mus. Blbg., p. 77.

Agraulis vanillae, BOISDUVAL AND LE CONTE, [1836?], Hist. Gen. lépid. Chen. Amér. Sept., p. 143.

Colaenis vanillae, H. W. BATES, 1863, Proc. Zool. Soc. London, p. 248.

This is a brilliant orange form with black markings considerably restricted.

Forewing usually with only the most basal spot of upper surface centered with silver; two basal spots of discal cell separated by much less than their diameters; spot at end of discal cell rather large, posterior one elongate, frequently reaching the rather large and elongate spot in cell M_3 ; spots in cells Cu_1 and Cu_2 commonly small or absent; black areas of apices of veins narrowed toward wing margin in male. Posterior wing with large orange spots on the black border, black not produced discally along veins; disc of posterior wings with but one or two black spots on upper surface. Under surface of posterior wings extensively streaked with yellowish between silver spots; marginal silver spots separate from one another.

Forewing with costal margin straight medially; proportion of length to breadth

(least breadth measuring from tornus to costa) averaging 2.12 (average of 12 males), ranging from 1.89 to 2.37. Forewing 33 to 40 mm. in length.

This form, the type locality of which is Surinam, is found in northern South America, Panama and the southernmost of the Lesser Antilles. Definite localities are as follows:

Santa Lucia: Port Castries, June 28, 1911. *Barbados*: St. Phillips, March 19, 1929 (F. M. Brown collection). *Trinidad*: Hololo Mountain Road, St. Anns, August 16, 1933. *Panama*: Palo Seco, February 24, 1935; Rio Trinidad; Pacora (E. I. Huntington); Balboa, February 18, 1935; Barro Colorado Island, March 22, 1933 (E. I. Huntington). *Venezuela*: Rio Palmar, March 29, 1938; Rio Suapure. *Colombia*: Barranca Bermeja (R. E. Stamm); San Miguel; Frijolea; Hormiguero, Cuaca Valley, 3260 feet, January 25, 1935; Cartagena; Cali District, Cauca Valley, 3260 feet, February 20, 1935. *British Guiana*: Tumatumari; Warani; Georgetown. *Dutch Guiana*: Wyambo; Gold Hope. *Brazil*: Para; Manoa. Recorded also from the islands of St. Vincent and Grenada.

This subspecies intergrades in the southern Lesser Antilles with *insularis* and in Brazil with *maculosa* and presumably in Panama with *incarnata*. The specimens from the two Brazilian localities mentioned above, both in the Amazon Valley, show the silver areas of the under surfaces of the forewings much reduced. They may represent a distinct subspecies or merely an approach to *lucina*, the least silvered subspecies. The markings of the upper surface do not suggest the very distinctive *lucina*.

***Agraulis vanillae insularis* Maynard**

Agraulis insularis MAYNARD, 1889, Contrib. to Sci., Newtonville, Mass., I, p. 89.

Dione vanillae insularis, STICHEL, 1907, Gen. Ins., Fasc. 63, p. 19.

Heliconius vanillae, MORITZ, 1836, Arch. Naturg., (2) I, p. 738.

This is a form of *vanillae* with rather heavy black markings.

Forewing on upper surface with a silver center in the basal spot and sometimes in the anterior spot at the extremity of the

discal cell; two basal spots of discal cell separated by much less than their diameters; spots of end of discal cell rather large, posterior one elongate, frequently reaching the rather elongate spot of cell M_3 ; spots in cells Cu_1 and Cu_2 usually large; black areas of apices of veins, at last that of vein Cu_2 , broadest at wing margin, those of more anterior veins narrowed in male. Posterior wing with large orange spots in black marginal band, black not being produced basally along veins; disc of posterior wing with two or three black spots. Under surface of posterior wing moderately streaked with yellowish between silver spots; marginal silver spots separate from one another.

Forewing with costal margin straight medially; proportion of length to breadth (least breadth measured from tornus) averaging 1.95 (average of 25 males), ranging from 1.91 to 2.08. Forewing 27 to 35 mm. in length.

This form, described from the Bahama Islands, occurs throughout the Antilles except for the southernmost Lesser Antilles where it is replaced by typical *vanillae*. Specimens from southern Florida exhibit no suggestion of admixture with *insularis*. Because of the great number of specimens of this form at hand, only the islands from which I have seen material are listed, more detailed data being omitted to conserve space.

Dominica, Guadeloupe, St. Kitts, St. Croix, St. Thomas, St. John, Puerto Rico, Hispaniola, Jamaica, Cuba, Andros, New Providence.

As has been pointed out to me by Dr. A. Avinoff, the population of the island of Jamaica differs slightly from populations on the other Antilles by the smaller average size of the black spots in cells Cu_1 and Cu_2 of the forewings of the male. In this respect Jamaican individuals approach typical *vanillae*.

Agraulis vanillae maculosa (Stichel)

Dione vanillae maculosa STICHEL, 1907, Gen. Ins., Fasc. 63, p. 18.

Dione vanillae form *superargentata* GIACOMELLI, 1925, Rev. Chilen. Hist. Nat., XXIX, p. 228.

The appearance of this subspecies is similar to that of typical *vanillae*.

Forewing with the most basal black spot and sometimes the anterior spot at end of the cell centered with silver on upper surface; two basal spots of discal cell separated by much less than their diameters; spots at end of discal cell of moderate size, sometimes separate from one another, posterior one, especially in male, small, short, separated in male by more than its length from spot in cell M_3 ; spots in cells Cu_1 and Cu_2 ordinarily present; black areas of apices of veins narrowed toward wing margin in male. Posterior wing with large orange spots in the black border of upper surface, black not produced discally along veins; disc of posterior wing ordinarily with three black spots on upper surface. Under surface of posterior wing rather extensively streaked with yellowish between silver spots; marginal silver spots separate from one another.

Forewing with costal margin straight medially; proportion of length to breadth (least breadth measured from tornus) averaging 1.98 (average of eight males), ranging from 1.91 to 2.02. Forewing 26 to 36 mm. in length.

The subspecies occurs in northern Argentina, Paraguay, southern Brazil and Chile. Definite localities are as follows:

Argentina: La Rioja. *Paraguay*: Nueva Italia; Villa Rica. *Brazil*: St. Catherina; Rio de Janeiro. *Chile*: Limache.

A few individuals in which the spots at the end of the discal cell of the forewing resemble those of *maculosa* occur within the range of typical *vanillae* as far north as British Guiana and Colombia.

Agraulis vanillae forbesi, new subspecies

In appearance this subspecies most closely resembles small specimens of *maculosa*, from which it differs by the browner abdomen; the shorter forewings, the costal margins of which are scarcely less convex medially than elsewhere; and by the fusion of pairs of silver spots along the outer margins of the posterior wings, particularly conspicuous in cell 1A where the fusion produces a long silver line and in cell Cu_2 where the posterior spot of the apex of the cell is reduced to a narrow line connected with the anterior spot. In these respects *forbesi* approaches *galapagensis*.

Forewing with most basal black spot minutely centered with silver, otherwise no silver on the upper surfaces of wings; two basal black spots of discal cell separated by a little less than their diameters; spots at end of discal cell united with one another, posterior one small, separated by about its length from spot in cell M_3 ; spots in cells Cu_1 and Cu_2 present; black areas on apices of veins narrowed toward the wing margin. Posterior wing with orange spots in black border of upper surface large, reducing the border to a chain of contiguous black rings, black not produced discally along veins; disc of posterior wing with three black spots above and usually an additional one in base of cell M_1 , immediately behind the usual one in the base of cell R_4 ; under surface of posterior wings rather extensively streaked with yellowish between silver spots, marginal silver spots in each cell from vein R_4 to $2A$ fused or nearly so along wing margin, those of cell $1A$ forming a single long silver line, posterior spot of cell Cu_2 reduced to a slender hook attached to apex of anterior spot.

Forewing with costal margin slightly straighter medially than elsewhere; proportion of length to breadth (least breadth measured from tornus) averaging 1.91 (average of twelve males), ranging from 1.84 to 1.95. Length of forewing 25 to 32 mm.

This subspecies occurs in the coastal region of Peru.

Holotype male and allotype female: Lima, Peru, May 7, 1920 (Wm. T. M. Forbes).

Paratypes, all from Peru: Three, labeled merely Peru (Henry Edwards collection, The American Museum of Natural History); eight, Lima, May 1-16, 1920; five, Chosica, May 3-4, 1920; seven, Matucana, May 12 and 13, 1920. Except as otherwise indicated, type material was taken by Dr. Forbes, and except for five paratypes in The American Museum of Natural History, it is in the Cornell University collection.

***Agraulis vanillae galapagensis* Holland**

Agraulis vanillae galapagensis HOLLAND, in Howard, 1889, Proc. U. S. Nat. Mus., XII, p. 194.

Dione vanillae galapagensis, STICHEL, 1918, N. Beitr. Syst. Ins.-kunde, I, p. 80.

This is a small subspecies with heavy black maculation.

Forewing without silver spots on the upper surface; two basal spots of discal cell large and approximate or fused; spots at end of discal cell large and fused, posterior one elongated, fused with spot in cell M_3 which extends entirely across the

cell and reaches or nearly reaches spot in cell Cu_1 ; spot in Cu_2 large; black areas of apices of veins broadened to wing margins. Posterior wing with moderate sized orange spots in marginal band, black scarcely produced discally along veins; disc of posterior wing with three black spots, the anterior distal one of which is usually fused with the marginal band. Yellowish streaking of under surface reduced; marginal silver spots of each cell or at least certain cells between veins M_1 and $2A$ united or nearly united along wing margin.

Forewing with costal margin convex throughout, proportion of length to breadth (least breadth measured from tornus) averaging 1.84 (average of 10 males), ranging from 1.73 to 2.01. Forewing 23 to 26 mm. in length.

This subspecies is known only from the Galapagos Islands. The type is from Chatham Island. Specimens at hand are from Indefatigable and James Islands.

The harpes in the male of this subspecies are more slender at the extreme apices, with fewer denticles than in the specimens of other subspecies. In any locality, however, some variation is found in these characters.

***Agraulis vanillae catella* (Stichel)**

Dione vanillae catella STICHEL, 1907, Gen. Ins., Fasc. 63, p. 18.

This is a brilliant orange form intermediate between *lucina* and the subspecies *vanillae* and *maculosa*. As explained below, it is probably not worthy of recognition as a subspecies and should perhaps be placed as a synonym of *lucina*.

Forewing without silver on dorsal surfaces; anterior margin of discal cell entirely black, this black fusing with the large black area at end of discal cell, which area nearly reaches black spot in cell M_3 ; black spot in cell Cu_1 large, in Cu_2 reduced (at least in figure of type); black areas of apices of veins expanded toward wing margin. Posterior wing with small orange spots in the broad black border, disc with only the apical anterior spot. Under surface of posterior wing extensively streaked with yellowish, silver areas somewhat reduced, par-

ticularly in discal cell; marginal silver spots separate from one another.

Forewing with costal margin more or less straightened medially.

The type locality of this form is Poguzo, Peru. Two specimens borrowed from the Reading Public Museum through the courtesy of Mr. L. S. Dillon agree with Stichel's figures. One is from Macas, El Oriente, Ecuador, January, 1926, and the other from Cavina, Bolivia. A third specimen from the latter locality differs from *catella* in the great distance between the black at the end of the discal cell and that in cell M_3 .

This form, like *lucina*, occurs on the eastern side of the Andes in the region of the upper Amazon basin. The large series of *lucina* before me is uniform, none approaching *catella*. In the collection of Cornell University, however, are a number of specimens, none of which agrees with *catella* as described and figured by Stichel, but which are discussed here as intergrades between *catella* and *lucina*. For information on these specimens I am indebted to Dr. Wm. T. M. Forbes. Three individuals from La Chorrera, Putumayo District, Peru (now Colombia), agree with *catella* except for the great reduction in the silver spots in cells Cu_1 and Cu_2 of the hind wing beneath, thus approaching *lucina*. A specimen from "Chanchamayo District" has fully developed silver areas beneath as in *catella*, but the black border of the upper surface of the hind wings is almost without orange spots, thus resembling *lucina*.

Other specimens bearing these same data as well as those from Huacapistana, via Central, east of Tarma, Peru, approach *maculosa* rather than *lucina*. The black border of the posterior wings is heavier than in *maculosa*, but as in that subspecies there are two silver dots on the upper surface of each forewing, the black at the end of the discal cell is nearly separate from that in the middle of the cell and the black spot in cell M_3 is isolated from other black areas.

In view of these facts it is impossible to map the distribution of *catella*, and it seems likely that *catella* is not a distinct subspecies but consists of a highly variable group of individuals occupying a more or less narrow zone of intergradation between

lucina and adjacent *vanillae*-like subspecies. If more adequate material shows this to be the case, *catella* should be considered as a synonym of *lucina*.

***Agraulis vanillae lucina* C. and R. Felder**

Agraulis lucina C. AND R. FELDER, 1862, Wien. Ent. Monatschr., VI, p. 110.

Dione lucina, W. F. KIRBY, 1871, Cat. Diurn. Lep., p. 148.

Dione vanillae lucina, STICHEL, 1907, Gen. Ins., Fasc. 63, p. 18.

This beautiful form is so different from *vanillae* that, were it not for the existence of the intermediate *catella*, it might be regarded as a distinct species.

Forewing without silver on upper surface; anterior margin of discal cell broadly black, the black fusing with that at apex of discal cell which is quite extensive and nearly reaches black spot in cell M_3 ; cells Cu_1 and Cu_2 without black spots; black areas of apices of veins broadened toward wing margin where they meet; distal third of anterior margin of wing broadly black. Posterior wing with broad, black, unspotted border and without discal spots. Under surface with very extensive yellowish areas; silver of hind wing reduced to a row of small separated spots along margin, a spot at base of cell M_3 and a small spot at base of cell Cu_2 .

Forewing with costal margin nearly straight medially but unusually strongly convex apically; proportion of length to breadth (least breadth measured from tornus) averaging 2.15 (average of 10 males), ranging from 2.05 to 2.25. Forewing 32 to 38 mm. in length.

A. v. lucina differs from all the other subspecies in having the first abscissa of vein Cu_1 of the forewing at least nearly as long as vein m-cu in the male. In males of the other forms which I have studied the first abscissa of Cu_1 is much shorter, while in *catella* an intermediate condition exists, to judge by the figure given by Stichel (1907). As has already been stated, *catella* is intermediate in maculation also between *lucina* and the *vanillae*-like subspecies.

This subspecies occurs on the eastern side of the Andes in Ecuador, Peru and Brazil. Specimens at hand are from the following localities:

Peru: Puerto Inca, Rio Pachitea; lower Rio Tapiche, August 3, 1923 (H. Bassler); upper Rio Tapiche, August, 1927 (H. Bassler); upper Rio Marañon, September to December, 1929 (H. Bassler); middle Rio Ucayali, September 19, 1923 (H. Bassler). *Ecuador*: Rio Anzu, 800 meters, December 18, 1936 (Clark-MacIntyre); Rio Blanco, May 14, 1937. *Brazil*: Porto Velho, Rio Medeira, Amazonas, November (B. Pohl, F. E. Church collection); Teffe, December (B. Pohl, F. E. Church collection); Porto América, Rio Ica.

Notes on the intergradation of this subspecies with *catella* are included in the discussion of that form.

Agraulis vanillae incarnata (Riley)

Dione vanillae ab *comstocki* GUNDER, 1925, Ent. News, XXXVI, p. 5.

Dione vanillae incarnata RILEY, 1926, Entom., LIX, p. 243.

Dione vanillae insularis tr. f. *fumosus* GUNDER, 1927, Ent. News, XXXVIII, p. 137.

Dione vanillae incarnata tr. f. *marginapertus* GUNDER, 1928, Can. Ent., LX, p. 163.

Dione vanillae incarnata tr. f. *heulettae* GUNDER, 1929, Bull. Brooklyn Ent. Soc., XXIV, p. 327.

This is a brilliant orange form with the black markings considerably reduced. It superficially resembles the typical *vanillae* from South America.

Forewing with both spots in discal cell and anterior spot at end of discal cell centered with silver; two basal spots of discal cell separated by nearly their diameters in most males; posterior spot of end of discal cell much reduced, transverse, separated by two or three times its length from spot in cell M_3 ; spots in cells Cu_1 and Cu_2 present, usually rather small; black areas at apices of veins separated by more than their widths in middle half of wing in male, broader posteriorly, area on Cu_2 broadest at wing margin. Posterior wing with moderate sized orange spots in the heavy marginal band, black extended discally along veins for a short distance in many individuals; disc of wing with one to three spots. Under surface of posterior wing not much streaked with yellowish; marginal spots of each cell between veins R_4 and $2A$ often united along wing margin.

Forewing with costal margin straight

medially; proportions of length to breadth (least breadth measured from tornus) averaging 2.04 (15 California males), extremes being 1.93 and 2.10. Forewing 31 to 37 mm. in length.

This is the subspecies of our southwestern states (rarely recorded from as far north as British Columbia), Mexico and most of Central America. The type locality is Durango City, Mexico. Specimens from Honduras show an approach to typical *vanillae* in the spots at the end of the cell of the forewing. All Central American and certain Texan examples are somewhat darker than the Californian *incarnata*, thus approaching *nigrior* of the southeastern United States. The proportions of the wings of this Central American material approach those of *nigrior*.

Specimens are at hand from the following localities:

California: San Diego; Dalzura; Glendale; Pasadena; Los Angeles. *Arizona*: Bear Canyon, Pima County April 9-17, 1931 (L. Martin); Greer, Sabino Basin, Santa Catalina Mountains; Cochise County. *Texas*: Alamo; Sanderson. *Arkansas*: Little Rock; Conway. *Missouri*: St. Louis; Willar. *Mexico*: Jalapa; Cordoba; Papachal, Sinaloa; La Bequilla, Durango; Durango; Las Bocas; Compostela, Nayarit; Chichen Itza, Yucatan. *Honduras*: Truxillo district; La Ceiba. *British Honduras*: Punta Gorda. *Guatemala*: Pt. Barros.

A single specimen labeled Cartagna, Colombia, is at hand. Specimens of typical *vanillae* are from the same locality. Unless this specimen is mislabeled it may indicate that *incarnata* does not intergrade with *vanillae* but overlaps it in distribution. In this case *incarnata* with its subspecies *nigrior* would have to be regarded as a species distinct from *vanillae*. The characters upon which it could be distinguished are indicated in the first couplet of the accompanying key.

The name by which this race is to be known is subject to some question. The subspecies was first properly described as *incarnata* by Riley in 1926. However, in 1925, Gunder described a specimen from California as an aberration of *vanillae*

under the name *comstocki*. Since in the International Code of Zoological Nomenclature infraspecific names other than subspecies are regarded as without a place in the nomenclature, it seems reasonable to recognize Riley's subspecific name rather than a name proposed for an abnormally infuscated individual.

Riley designated no holotype of *incarnata*. I hereby designate his male specimen (the first mentioned by Riley) as the lectotype. It bears the British Museum type number Rh. 10118, as shown by photographs of two "type" specimens in the collection of Mr. C. F. dos Passos.

***Agraulis vanillae nigrior*, new subspecies**

This form, particularly in the female, is usually somewhat less brilliant in background color than the most closely related subspecies, *incarnata*. In addition the black markings are more extensive than in that form.

Forewing with both spots in discal cell and anterior spot at end of discal cell centered with silver; two basal spots of cell separated by much less than their diameters; posterior spot at end of discal cell much reduced, transverse, separated by one and one-half to three times its length from spot in cell M_2 ; spots in cells Cu_1 and Cu_2 large; black areas of apices of veins usually separated by about their width in middle half of wing, broader posteriorly, area on vein Cu_2 broadest on wing margin. Posterior wing with moderate sized orange spots in heavy marginal band, black extending discally along veins for a considerable distance in most individuals; disc of wing with three black spots, the anterior apical one large. Under surface of posterior wing not much streaked with yellowish; marginal silver spots of each cell between veins R_4 and $2A$ often united along wing margin.

Forewing with costal margin straight medially; proportions of length to breadth (least breadth measured from tornus) averaging 1.98 (25 males), extremes being 1.89 and 2.01. Forewing 32 to 40 mm. in length.

This is a subspecies of the southeastern United States. It is abundant in Florida and along the Gulf Coast but occurs at least occasionally in summer as far north as New York. It is entirely distinct from *insularis* but intergrades with *incarnata* in Texas and thence southward.

Holotype male: Upper Matecumbe Key, Florida, February 19, 1932 (F. E. Church).

Allotype female: Indian River, Florida (Henry Edwards collection No. 4158).

Paratypes, all from Florida: two, Mayport, October 4 and 9, 1922; two, La Belle, November 14, 1911; three, Gainesville, September 26–October 2, 1914; three, Jupiter, February 1–24, 1920, March 19, 1921 (Wm. C. Wood); one, Lakeland, November 10, 1911; three, Upper Matecumbe Key, February 18, 22 and 23, 1932 (F. E. Church); one, Lower Matecumbe Key, March 26, 1934 (F. E. Church); two, Key Largo, June 11; two, Indian River (Henry Edwards collection No. 4158); five, Jacksonville, September 5, 8, 9 and 18, 1932, and June 18, 1922; two, De Funiak Springs, October 17–19, 1914; three, Miami, April 15–May 3, 1904 (Wm. C. Wood), and June 9 and August 1 and 4, 1939; one, Deep Lake, April 13, 1912; one, Port Sewall, March 8, 1939; one, Long Key, April 19, 1923; one, Key West, March 26, 1938 (V. H. dos Passos); two, De Land, March 23, 1938 (V. H. dos Passos). The holotype, allotype and a series of paratypes are in the collection of The American Museum of Natural History. Additional paratypes are in the collections of Mr. C. F. dos Passos and Cornell University.

Additional specimens at hand:

Alabama: Hazen, October 25, 1918 (L. B. Woodruff); Cowarts, August 1 to 3, 1916. *Louisiana*: New Orleans, November 7, 1919 (C. W. Mathias). *Georgia*: Valdosta, July 20–21, 1916; Kirkwood, August 6 (J. A. Grossbeck); Rocky Ford (J. D. Gunder collection). *North Carolina*: Black Mountains (W. Beutenmuller).

A series of twenty-two specimens from Bermuda also belongs to this subspecies, although they are smaller than the average of the mainland forms and have the band of androconia on vein M_1 usually narrower than that on the other veins, unlike most mainland individuals.

Specimens from Texas kindly lent by Mr. C. F. dos Passos, show an approach to *incarnata*, under which they are recorded, in the smaller spots of cells M_3 , Cu_1 and Cu_2 .

